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10/575,776	04/13/2006	Masahiro Yoshioka	0760-0353PUS1	3792

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EXAMINER	
PAK, HANNAH J	

ART UNIT	PAPER NUMBER
1764	

NOTIFICATION DATE	DELIVERY MODE
08/17/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/575,776	YOSHIOKA ET AL.	
	Examiner	Art Unit	
	HANNAH PAK	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 June 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-7,11-15 and 17-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-7,11-15 and 17-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/01/2011*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The Applicant's amendment and arguments in the Remarks filed 06/03/2011 have been considered and deemed to be partly persuasive to the extent that rejection over Tsukamoto et al. (Machine Translation of JP 2000-143985) in view of Nakamura et al. (US 6,582,862) is no longer tenable. However, upon a search update new relevant art (cited in the rejections below) was uncovered. It is the examiner's position that a new reference in combination with Tsukamoto et al. and Nakamura et al. appear to render the present claims unpatentable. For the record, new grounds of rejection are set forth below. The finality of the preceding office action mailed 01/03/2011 is hereby withdrawn and a new non-final action is set forth. The delay in prosecution is regretted.

Response to Amendment

2. The applicants amended claim 1 to include the limitation of carbon, which is supported by cancelled original claim 9. Thus, no new matter is introduced.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-2, 11-15, and 19-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukamoto et al. (Machine Translation of JP 2000-143985) in view of Nakamura et al. (US 6,582,862) and Nagashima et al. (US 2002/0051106).

Tsukamoto et al. disclose a black coating composition useful as a resin black matrix for color filters in liquid crystal displays (Paragraphs [0002] and [0005]). The black coating composition taught by Tsukamoto et al. comprises titanic acid nitrides or titanium black having the structure of TiNO (titanium nitride oxide), a solvent, a photosensitive resin, such as an acrylic resin and a polyimide resin (Paragraphs [0012], [0017], and [0021]). Furthermore, Tsukamoto et al. disclose X-ray intensity ratio R having the following formula (Paragraphs [0011] and [0012]):

$$R=I_3/\{I_3+1.8x(I_1+1.8xI_2)\};$$

wherein R is 0.28 or more, I_1 represents the maximum diffraction line intensity of the titanic acid nitrides when the angle of diffraction 2 theta, determined by using a X line source CuK alpha rays, is 25-26 degrees, I_2 represents the maximum diffraction line intensity of the titanic acid nitrides when the angle of diffraction 2 theta is 27-28 degrees, and I_3 represents the maximum diffraction intensity of the titanic acid nitrides when the angle of diffraction 2 theta is 36-38 degrees. As is apparent from the above, R corresponds to the claimed R_1 and embraces a value inclusive of the claimed R_1 value. I_3 is identical to the claimed I_3. I_1 and I_2 values taught by Tsukamoto et al., therefore, necessarily overlap with the claimed I_1 and I_2 values, i.e., the claimed R_2 value, to arrive at the R value of 0.28 or more.

Although Tsukamoto et al. do not mention the specific weight ratio of the titanium nitride oxide to acrylic resin, Tsukamoto et al. teach the importance of using the appropriate weight ratio for given titanic acid nitride to a polymer resin to obtain high optical density (OD) value and high resistance, and exemplifies titanic acid nitride/polyimide (which is interchangeably used with another photosensitive resin, such as acrylic resin) in the weight ratio of 90/10 to 40/60 (Paragraph [0018]). Thus, it can be inferred from this disclosure that the weight ratio of the titanium acid nitride/acrylic resin, not only overlaps with the claimed weight ratio of 75/25 to 60/40, but also, is a results-effective variable. Accordingly, it would have been obvious to one of ordinary skill in the art to employ the optimum or workable weight ratio of titanic acid nitride to acrylic resin in the black coating composition with a reasonable expectation of successfully providing high resistant properties and high OD value, such as greater than 4.0, *see MPEP § 2144.05, IIB.*

As to claims 1-2, 11-12, and 15, Tsukamoto et al. do not mention the specific X-ray intension ratio R and optical density (OD value) ranges. As mentioned above, Tsukamoto et al. teach X-ray intensity ratio R of 0.28 or more, which overlaps with those claimed, e.g., R_1 value of 0.70-0.82 and R_1 of not less than 0.80. Moreover, Tsukamoto et al. teach their black coating composition having a more preferably OD value of 4.0 or more (per 1 micrometer of 1 of film pressure (Paragraph [0023]), which overlaps with those claimed, e.g., OD value of not less than 4.4 per 1 μm of film thickness. Therefore, the subject matter as a whole would have been obvious to one having ordinary skill in the art at the invention was made, since it has been held that choosing the overlapping

portion of the ranges taught by Tsukamoto et al., and the ranges claimed by the applicant, has been held to be a *prima facie* case of obviousness, see *MPEP § 2144.05.*

As to functionally defined OD value, i.e., transmittance of i-ray ultraviolet light through a resin black matrix obtained from said black composition is more than 0.2% when the OD value is 2.0, recited in claim 1, there is reasonable basis to believe that the black coating composition suggested by Tsukamoto et al. also possess the OD value, which at least overlap with the claimed functionally defined OD value, since Tsukamoto et al. teach its black coating composition having the claimed ingredients as mentioned above.

As to photocuring property and components recited in claims 1 and 26, Tsukamoto et al. teach using a photosensitive resin in their black coating composition useful for color filters in liquid crystal display (LCD) (Paragraph [0022]). Although Tsukamoto et al. do not specifically mention photocuring its black coating composition, the term "photosensitive resin" is synonymous with photocurable resin according to Col. 1, lines 15-30 of Nakamura et al. Nakamura et al. also teach a coating composition used in color filters of liquid crystal display (LCD) (Col. 8, lines 55-62) comprising a photosensitive resin, inclusive of those taught by Tsukamoto et al., can be photo-cured, via introducing a photoinitiator and photopolymerizable monomer (Col 9., lines 5-20, Col. 13, lines 51-55, and Col. 47, lines 35-65). Thus, it would have been obvious to one of ordinary skill in the art include the photoinitiator and photopolymerizable monomer as taught by Nakamura et al. in the black composition of the type discussed in Tsukamoto

et al., motivated by a reasonable expectation of successfully providing desired photocurable properties, such as that claimed, useful for preparing color filter of LCD.

As to the carbon black in the newly amended claim, according to the attached oral translation of paragraph [0009] of Tsukamoto et al., carbon black is a known shielding agent for black film compositions useful for liquid crystal displays (LCDs). Tsukamoto et al. also disclose that carbon black has high light shielding property but low electrical resistance. Tsukamoto et al. do not teach away from using carbon black. Rather, Tsukamoto et al. imply that the low electrical resistance of carbon black is dealt with by lowering its concentration, when used together with titanium nitride oxide which provides a compensatory increase in electrical resistance. Nagashima et al. reinforce such teaching. In particular, Nagashima et al. not only teach that carbon black can be used with titanium nitride oxide, inclusive of the titanic acid nitrides taught by Tsukamoto et al., to form a film composition useful for a LCD device, but also teach that such composition impart desired light shielding properties and electrical resistance for the LCD purpose (Paragraphs [00138]-[00140] of Nagashima et al.). Moreover, although the carbon black and titanium nitride oxide taught by Nagashima et al. are dispersed in a polyester resin of the film composition, it is noted that Tsukamoto et al. teach using any photosensitive and non-photosensitive resins, which can be inclusive of the polyester resin taught by Nagashima et al., in forming the matrix of the black film composition useful for LCDs.

Given the above teachings, it would have been obvious to one of ordinary skill in the art to use carbon black and titanium nitride oxide, as taught by Nagashima et al., in

the black film composition of Tsukamoto et al., with a reasonable expectation of successfully providing desired light shielding and electric resistant properties useful for LCDs.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukamoto et al. (Machine Translation of JP 2000-143985) in view of Nakamura et al. (US 6,582,862) and Nagashima et al. (US 2002/0051106) as applied to claims 1-2, 11-15, and 19-26, and further in view of Tanaka et al. (US 2004/0236006).

The disclosures with respect to Tsukamoto et al., Nakamura et al., and Nagashima et al. in paragraph 4 are discussed above. Although they broadly mention using any solvent in the black film composition (Paragraph [0009], they do not mention the specific properties, i.e., boiling point temperature and viscosity, of its solvent.

However, Tanaka et al. disclose employing a solvent, e.g. 3-methoxy-3-methyl-1-butanol, which according to page 12, lines 15-18, of the present specification has the claimed boiling point and viscosity, in a black composition suitable for preparing color filters of LCD to obtain desired uniform coating (Paragraphs [0019], [0022], [0040] and [0043] of Tanaka et al.).

Given the above teachings, it would have been obvious to one of ordinary skill in the art to use the solvent having the claimed properties as taught by Tanaka et al. as the solvent in the black film composition suggested by Tsukamoto et al., Nakamura et al., and Nagashima et al., motivated by a reasonable expectation of successfully providing advantageous uniform coating.

6. Claims 5-7 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukamoto et al. (Machine Translation of JP 2000-143985) in view of Nakamura et al. (US 6,582,862) and Nagashima et al. (US 2002/0051106) as applied to claims 1-2,11-15, and 19-26 above, and further in view of Hedaya et al. (US 4,208,492).

The disclosures with respect to Tsukamoto et al., Nakamura et al., and Nagashima et al. in paragraph 4 are discussed above. They do not mention the addition of a specific siloxane compound as required by the claims.

However, Hedaya et al. disclose employing a siloxane polymer compounded with other fillers and additives that are useful for a wide variety of applications, which exhibits excellent mechanical properties, including good tensile strength and elongation, good resilience, and thermal stability and has the formula (Col 1, lines 15-25, Col. 3, lines 5-10, and Col. 5, lines 45-51):

$(R^3)(R^3)N\text{-}C(=O)\text{-}(R^2)(N)\text{-}(R^1)(R^2)Si\text{-}[O\text{-}(R^1)(R^2)Si]_p\text{-}(R^2)N\text{-}C(=O)\text{-}(R^3)(R^3)N.$

The above formula corresponds to the claimed formula from right to left, wherein p value of 0-4 corresponds to n, R^1-R^2 is the same as the claimed R^1 and R^3-R^6, representing alkyl groups (such as methyl or ethyl), and R^3 corresponds to the claimed tetramethylene bonds, representing alkylene groups (Col. 3, line 40-Col. 4, line 40). The above formula also contains amide bond and an ester bond, which corresponds to the claimed R^2 (Col. 5, lines 45-50).

Given the above teachings, it would have been obvious to one of ordinary skill in the art to employ the siloxane polymer of Hedaya et al. compounded with other fillers

and additives in the composition suggested by Tsukamoto et al., Nakamura et al., and Nagashima et al., motivated by a reasonable expectation of successfully providing desired mechanical properties, including good tensile strength and elongation, good resilience, and thermal stability, to such composition.

Response to Arguments

7.

(A)

Applicants' Argument: The applicants argue that the Tsukamoto et al. fail to disclose or suggest a composition that contains the combination of titanium nitride oxide and carbon black as in the present invention (see Pages 8 and 10 of the Applicants' Remarks). The applicants also argue that the use of titanium nitride oxide and acidic carbon black in Example 9 of the present specification provides a resolution that is "advantageously higher and the development margin was wider than those attained by using the composition of Example 8" (see page 8 of the Applicants' Remarks). It appears that the applicants are taking the position that the claimed invention imparts improved resolution which is not expected by one of ordinary skill in the art.

Examiner's Response: **(1)** First of all, as mentioned above, according to the attached oral translation of paragraph [0009] of Tsukamoto et al., carbon black is a known shielding agent for black film compositions useful for liquid crystal displays (LCDs). Tsukamoto et al. also disclose that carbon black has high light shielding property but low electrical resistance. Tsukamoto et al. do not teach away from using carbon black.

Rather, Tsukamoto et al. imply that the low electrical resistance of carbon black is dealt with by lowering its concentration, when used together with titanium nitride oxide which provides a compensatory increase in electrical resistance. Nagashima et al. reinforce such teaching. In particular, Nagashima et al. not only teach that carbon black can be used with titanium nitride oxide, inclusive of the titanic acid nitrides taught by Tsukamoto et al., to form a film composition useful for a LCD device, but also teach that such composition impart desired light shielding properties and electrical resistance for the LCD purpose (Paragraphs [00138]-[00140] of Nagashima et al.). Moreover, although the carbon black and titanium nitride oxide taught by Nagashima et al. are dispersed in a polyester resin of the film composition, it is noted that Tsukamoto et al. teach using any photosensitive and non-photosensitive resins, which can be inclusive of the polyester resin taught by Nagashima et al., in forming the matrix of the black film composition useful for LCDs.

Given the above teachings, it would have been obvious to one of ordinary skill in the art to use carbon black and titanium nitride oxide, as taught by Nagashima et al., in the black film composition of Tsukamoto et al., with a reasonable expectation of successfully providing desired light shielding and electric resistant properties useful for LCDs.

(2) As to the showing provided by the applicants, Example 8 of the present specification, supposedly representative of the closest prior art, drawn to using titanium nitride oxide A alone (without carbon black) provides a coating film having a line-and-space pattern of not less than 6 μm could be obtained within the range of immersion

time between 90 seconds and 130 seconds. On the other hand, Example 9, supposedly representative of the claimed invention, drawn to the use of titanium nitride oxide A and an acidic carbon black in the ratio of 50/50 to provide a coating film having a line-and-space pattern with a width of not less than 5 μm within the range of immersion time between 90 seconds and 150 seconds. Although there are some differences in the results in using titanium nitride oxide A alone and a combination of titanium nitride oxide A and acidic carbon black, applicants have not shown that such difference is not within the margin of error in the given experimentation. In other words, the applicants have not shown that the difference is unexpected. In addition, the applicants have not shown that such a showing is commensurate in scope with degree of protection sought by the claims. While Example 9, representative of the claimed invention, is limited to using a specifically prepared titanium nitride oxide A and an acidic carbon black in a ratio of 50/50, the claims are not so limited. The claims, as recited, include non-acidic carbon black and differently prepared titanium nitride oxide used in any weight ratio, which are outside of that shown in Example 9.

(B)

Applicants' Argument: The applicants argue that the composition of Tsukamoto does not exhibit the OD value of not less than 4.4 per 1 um of thickness (see Page 9 of the Applicants' Remarks). In support of such argument, the applicants submitted a declaration under 37 CFR 1.132 executed by Mr. Ryo Nagase, a co-applicant of the present invention.

Examiner's Response: However, the applicants have not shown that the black composition taught by Tsukamoto does not have the OD values inclusive of those claimed. In particular, Tsukamoto teaches OD values of their black composition can be lower or identical to that claimed, e.g., preferably OD value of more than 4.0. In other words, Tsukamoto teaches overlapping OD values. The declaration only shows this teaching by exemplifying one of the black compositions taught by Tsukamoto within its OD range value, e.g., lower end. Accordingly, the declaration fails to compare the higher OD value taught by Tsukamoto with the claimed OD value.

(**C**)

Applicants' Argument: The applicants argue that the composition of Tsukamoto cannot exhibit any photocuring properties (see Pages 10-11 of the Applicants' Remarks). In support of such arguments, the applicants again rely on the same declaration. The declaration in particular compares Tuskamoto's composition without a photoinitiator and photopolymerizable monomer, which are important components for photo-curing and applicants' composition with a photoinitiator and photopolymerizable monomer.

Examiner's Response: however, this showing is not truly comparative since any photocuring agents, i.e., photoinitiator and photopolymerizable monomer, were used in the black composition of Tsukamoto et al. As indicated above, for purposes of photocuring the photosensitive resin, such as those taught by Tsukamoto et al. and the claims, the presence of the photocuring agents, such as photoinitiator and photopolymerizable monomer, is known to be critical. As also indicated above, it is apparent from the teachings of Nakamura, the claimed photocurable properties is

reasonably expected from adding the photocuring agent, such as the photoinitiator and photopolymerizable monomer, in the black composition taught by Tsukamoto. Thus, the declaration showing is not sufficient to rebut the prima facie case of obviousness established by the teachings of references cited.

(D)

Applicants' Argument: The applicants contend that the claimed invention imparts unexpected advantageous properties, i.e., high OD value and high adhesion properties (see Pages 9-11 of the Applicants' Remarks). The applicants further rely on the examples on pages 24-29 of the present specification as support.

Examiner's Response: The applicants' argument and examples in the present specification directed to alleged unexpected results do not overcome the prima facie case of obviousness established in the record. While it is true that a showing of unexpected results can rebut any inference of obviousness established by the prior art of record, the applicants have the burden of showing that the claimed invention as whole imparts such unexpected results. **(1)** This burden requires the applicants to show that the alleged improvement in properties is actually unexpected. However, the applicants have not carried this burden since Tsukamoto shows the alleged improvement in high OD value and other properties would be expected from optimizing the weight ratio of the titanium nitride oxide to acrylic resin. **(2)** The examples in the present specification do not include any direct comparison in the form of experiments between the claimed invention against a prior art reference, e.g., Tsukamoto, wherein the actual difference, is shown to impart unexpected results. This showing is especially

important since, like the applicants, Tsukamoto teaches a black composition having a high OD value comprising a solvent, and a titanium nitride oxide/acrylic resin in the claimed weight ratio. Moreover, the declaration mentioned above is also not sufficient for the reasons stated above. Accordingly, the applicants fail to rebut the prima facie case of obviousness established in the record.

(E)

Applicants' Argument: The applicants argue that Nakamura, Tanaka, and Hedaya fails to make up the deficiencies of Tsukamoto et al. (see Page 11 of the Applicants' Remarks).

Examiner's Response: While Nakamura, Tanaka and Hedaya do not disclose all the features of the claimed invention, they are utilized as teaching references and therefore, it is not necessary for these secondary references to contain all the features of the presently claimed invention. Rather, these references teach certain concepts, i.e., addition of a specific solvent, photocurable resin and initiators, and a specific siloxane polymer, in a composition useful for liquid crystal display, and in combination Tsukamoto et al., disclose the presently claimed invention.

Conclusion

8. The prior art made of record (i.e., Inoue et al., Machine Translation of JP 09-015403) and not relied upon is considered pertinent to applicant's disclosure. In particular, Inoue et al. teach dispersing carbon black alone in a black matrix to provide it

with high light shieldability and improved pattern workability (see, for example, [abstract]).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hannah Pak whose telephone number is (571) 270-5456. The examiner can normally be reached on Monday - alternating Fridays (7:30 am - 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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